

Question: Explain why the drainage Basin can be described as a complex open system (of input, throughputs, stores and output) and why it is so important that man understands how water travels through this system?

The drainage basin can be described as a drainage system that allows water to drain off, so it is a big drain which gets smaller until escapes the basin to the mouth of the water where it meets the sea. A Drainage basin can be described as a complex open system because it is a part of the water cycle that is the biggest open system. By this, I mean that a drainage basin is a system that forms part of the water cycle as it has different characteristics, which include inputs, outputs, storage and through flow. The significance of an open system:

Precipitation is a main form of input, although the amount varies over time and space, this makes up a big part of the input to a system with a certain rule, this rule is with the increase of intensity of a storm the decrease in the duration and the decrease of the space. For the Drainage basin to be an open system it has to include an output, this can be explained by the place where the water is lost which can happen by either the river carrying the water out of the basin or evapotranspiration. Evapotranspiration can be divided into two separate words, evaporation (physical process) is the first, which can be defined as the loss of water from different surfaces including soil and water to the earth's atmosphere. The second part is transpiration (biological process) it is the loss of water from vegetation although it is more complex as it includes water loss from the pores of a leaf but this only occurs depending on a certain time of the year, the type of the plant, the amount of the vegetation and even the availability of moisture.

Storage is a smaller part of the system; it is where water for a particular reason is held up possibly by a surface or a surrounding. A Lake is a storage place for water surrounded by land. There are also other places, like forests that according to suggestions from Newson "Estimates suggest that in a woodland area up to 30 percent of the precipitation may be lost through interception, which helps to explain why soil erosion is limited in forests". This was taken by David Waugh 'Geography An Integrated Approach'. The reason that storage is important is because it can be used in months that the water level is low and the storage can be used for irrigation and other things, backup plans for the water like devastations like droughts or close up wood fires.

For the final part of the drainage basin I will explain transfers formally known as through flow. Percolation is water which reaches a deeper soil that hits a soil more compact and water can not seep through so that creates ground water storage. There is also infiltration where if the surface has minute pores they allow water to enter. Channel flow is represented by the water, which works its way to the river more than directly entering the river. There are different ways that the water makes its way to the river:

- Surface run off
- Through flow
- Ground water flow

After the water makes its way to the river it starts another long journey to make its way to the sea and escapes the drainage basin.

It is important that man knows how the drainage basin works and all the influences around the drainage basin, which I have explained. Man has to know how

all these different processes work so that he can use it to an advantage and have the upper hand on nature and try to decrease floods and natural disasters. By knowing how much precipitation the drainage basin can carry, man can try to predict the flood risk. Man can study the drainage basin with a flood hydrograph; this shows how the drainage basin responds to the rainfall. So if man can discover the amount of the precipitation, he can find out if the drainage basin can hold with the amount and if necessary he can prepare for floods and avoid any deaths or serious damage.

Controlling the drainage basin is very important as river discharge can increase nearly immediately and cause floods. There are different things that can affect the way a drainage basin responds to precipitation, the smaller the basin the quicker the rain will reach the river channel as it has a smaller distance to travel. There is also the fact of the relief, if the land is steep it will find the river in a quicker time. Obstructions like vegetation all need to be considered, as interception will cause it to slow down, on the other hand in the winter there is less surface area of the tree to intercept the precipitation as the leaves have dropped and exposed the land underneath. There are so many different things, which can affect the hydrographs even the temperature as it can make the surface hard that will increase surface runoff.

One of the case studies that I have studied is the drainage basin of the Mississippi and I have found that man has investigated the main parts, as floods were occurring often, and they have took the necessary precautions and predictions to prevent floods. Different precautions they have taken are to put levees and build new dams, they have also deepened the rivers in the drainage basin and flood warning systems to warn the town of possible floods.